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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.												
10/523,943	08/25/2005	Iiro Hictanen	800213US	8551												
7590 William E Lewis Ryan Mason & Lewis 90 Forest Avenue Locust Valley, NY 11560		06/29/2007	<table border="1"><tr><td colspan="2">EXAMINER</td></tr><tr><td colspan="2">MALEVIC, DJURA</td></tr><tr><td>ART UNIT</td><td>PAPER NUMBER</td></tr><tr><td>2884</td><td></td></tr><tr><td>MAIL DATE</td><td>DELIVERY MODE</td></tr><tr><td>06/29/2007</td><td>PAPER</td></tr></table>		EXAMINER		MALEVIC, DJURA		ART UNIT	PAPER NUMBER	2884		MAIL DATE	DELIVERY MODE	06/29/2007	PAPER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

10/523,943

Applicant(s)

HIETANEN ET AL.

Examiner

Djura Malevic

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2884

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 34-67 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 34-67 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 2/8/2005
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

**Claim Rejections - 35 USC § 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

**Office action:**

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 34 – 42 and 52 – 67 are rejected under 35 U.S.C. 102(b) as being anticipated by Timlin et al. (US Patent 5,227,656).

With regards to claims 34, 63, 66 and 67, Timlin discloses an array of photodiodes extending in two dimensions (Figures 3 - 9) and comprising: a plurality of anodes 62 formed at first surfaces of a corresponding plurality of substrates 71; a corresponding plurality of cathodes 63 formed at second surfaces of the plurality of substrates 71; an electrical interconnection (59 or 81) between the plurality of anodes 63; and a connector interface (combination of 53 and 54) provided with a corresponding plurality of contacts 55 electrically connected to the respective cathodes 63 for reading output signals provided by the plurality of cathodes 63.

With regards to claim 35, Timlin disclose the plurality of substrates are formed by dividing a single substrate 71 (Col. 8, Line 25++).

With regards to claim 36, Timlin discloses a passivation layer 61 connects the plurality of substrates 71 (Figure 8).

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With regards to claim 37, Timlin discloses the plurality of cathodes 63 comprise a plurality of conductive layers 55 formed at the surface of the substrate 71.

With regards to claim 38, Timlin discloses a metal layer 54 on each conductive layer 55.

With regards to claim 39, Timlin discloses the plurality of anodes 62 comprise a plurality of active regions formed at the first surface (Col. 7, Line 66++).

With regards to claim 40, Timlin discloses a metal contact (59 or 81) for each active region.

With regards to claims 41 and 64, Timlin discloses the electrical interconnection is provided by one of: wire bonding, metal contacts, or a conductive sheet (Col. 7, line 23) (Col. 10, Line 33).

With regards to claim 42, Timlin discloses the plurality of substrates is formed on the connector interface (combination of 53 and 54).

With regards to claim 52, Timlin discloses a method of forming an array of photodiodes extending in two directions (Figures 3 - 9), comprising: forming a plurality of anodes 62 at a first surface of a substrate 71; forming a corresponding plurality of cathodes 63 at a second surface of the substrate 71; dividing the substrate into a corresponding plurality of substrates (Col. 8, line 25++) (Also, see figures 3, 7 and 8); electrically interconnecting the plurality of anodes (59 or 81); providing a connector interface (combination of 53 and 54) comprising a corresponding plurality of contacts 55; and electrically connecting the plurality of

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contacts to the respective cathodes 63, wherein the plurality of cathodes 63 provide the plurality of output signals of the array.

With regards to claim 53, Timlin discloses the plurality of cathodes 63 comprise a plurality of conductive layers 55 formed at the surface of the substrate 71.

With regards to claim 54, Timlin discloses the plurality of conductive layers are formed by providing a continuous conductive layer on the second surface of the single substrate, and electrically isolating portions of the continuous layer to form the plurality of conductive layers (Col. 10, Line 1++).

With regards to claim 55, Timlin discloses that portions of the conductive layer are electrically isolated by etching or cutting the continuous conductive layer (Col. 10, Line 1++).

With regards to claim 56, Timlin discloses the step of etching or cutting further etches the substrate (Col. 10, Line 1++)(Col. 8, Line 25++).

With regards to claim 57, Timlin discloses the substrate is etched or cut completely (Col. 10, Line 1++)(Col. 8, Line 25++).

With regards to claim 58, Timlin discloses a passivation layer on the first surface of the substrate is unaffected by the etch or cut (Col. 10, Line 42).

With regards to claim 59, Timlin discloses a plurality of isolated substrate portions thus is formed (Figures 3, 7 and 8).

With regards to claim 60, Timlin discloses the etch or cut is patterned such that a contiguous area is etched or cut around each cathode (Figures 3, 7 and 8).

With regards to claim 61, Timlin discloses the step of interconnecting the plurality of anodes includes providing between the plurality of anodes one of: wire bonding, a metal interconnect, or a conductive sheet over the first surfaces (Col. 10, Line 38).

With regards to claim 62, Timlin discloses the connector interface comprises one of: a plurality of pads for connection to the plurality of cathodes, a substrate, or an integrated circuit (Col. 7, Line 23)(Col. 8, Line 47)

With regards to claim 63, Timlin discloses an array of photodiodes extending in two dimensions (Figures 3 - 9) and comprising: a plurality of anodes 62 formed at first surfaces of a corresponding plurality of substrates 71; a corresponding plurality of cathodes 63 formed at second surfaces of the plurality of substrates 71; an electrical interconnection (59 or 81) between the plurality of anodes 63; and a connector interface (combination of 53 and 54) provided with a corresponding plurality of contacts 55 electrically connected to the respective cathodes 63 for reading output signals provided by the plurality of cathodes 63.

With regards to claim 65, Timlin discloses the connector interface comprises one of: a plurality of pads for connection to the plurality of cathodes 62, a 71substrate, or an integrated circuit 53.

### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which

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said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Timlin in view of Lingren et al. (US Patent 5,786,597).

With regards to claim 43, Timlin discloses the photodiode array as claimed in claim 34, absent some degree of criticality the recitation of an epoxy connecting the plurality of cathodes to contacts is considered an obvious matter of design choice involving only routine skill in the art. For example, Lingren teaches that preferably, epoxy is used to bond electrodes to the detection elements and/or contact pads (Col. 9, Line 1++). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use epoxy for bonding such as that taught by Lingren in order to correctly bond the cathodes to the contacts.

Claims 44 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekine et al (US Pub. 20020153492 A1) in view of Timlin.

With regards to claims 44 and 45, Sekine discloses a computed tomography imaging system comprising a photodiode array wherein the photodiodes are formed out of InSb [002,0138]. Absent some degree of criticality, the recitation of the particulars (i.e., the configuration of the photodiodes with respect to the cathodes, anodes and corresponding substrates) of the two-dimensional array detector. Timlin teaches an imaging system including an array of photodiodes comprising InSb and a connector interface, along with all the particulars of the claimed configuration (see rejection of claim 34). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention

was made to modify Sekine to include the particulars (i.e., the configuration of the photodiode array) such as that taught by Timlin in order to eliminate optical and electrical crosstalk between the diodes of the array and to isolate the individual indium antimonide diode detector, which removes thermal expansion stress from the detector material (Col. 9, Lines 36 –43).

Additionally, it is noted that a recitation with respect to the manner in which a claimed apparatus is intended to be used does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. In this case, Timlin teaches the body of the claim but fails to teach the intended use (i.e., Computed tomography imaging system).

Claims 46 – 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekine and Timlin in view of Lingren.

With regards to claim 46, Sekine and Timlin discloses the claimed particulars (i.e., the configuration of the photodiodes with respect to the cathodes, anodes and corresponding substrates) of the claimed invention (see rejection of claims 44 and 45 above). Sekine and Timlin fail to expressly disclose a plurality of said sub-arrays of photo-diodes are placed adjacent to each other in a matrix to form the photo-detector array. Lingren teaches pluralities of said sub-arrays of photo-diodes are placed adjacent to each other in a matrix to form the photo-detector array (Col. 7, Line 7++). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combination of Sekine and Timlin to include the array of photodetectors (i.e., an



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array of photodiode arrays) such as that taught by Lingren in order to enlarge the detecting field of view.

With regards to claim 47, Lingren discloses the matrix extends in two directions (Figure 2).

With regards to claims 48, Sekine and Timlin discloses the claimed particulars (i.e., the configuration of the photodiodes with respect to the cathodes, anodes and corresponding substrates) of the claimed invention (see rejection of claims 44 and 45 above). Sekine also teaches an X-ray CT system [0002++] comprising a radiation source facing the radiation detector and means for controlling the radiation detector and the radiation source. Sekine and Timlin fail to expressly disclose a plurality of said sub-arrays of photo-diodes are placed adjacent to each other in a matrix to form the photo-detector array. Lingren teaches pluralities of said sub-arrays of photo-diodes are placed adjacent to each other in a matrix to form the photo-detector array (Col. 7, Line 7++). Thus, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combination of Sekine and Timlin to include the array of photodetectors (i.e., an array of photodiode arrays) such as that taught by Lingren in order to enlarge the detecting field of view.

With regards to claim 49, Sekine discloses a radiation source is an X-ray tube equipped with a high-voltage generator [0002].

With regards to claim 50, Sekine discloses the radiation detector and the radiation source are radially mounted in a cylindrical scanning structure.

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With regards to claim 51, Sekine discloses the means for controlling comprises a computer system [0002].

### **Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Djura Malevic whose telephone number is 571.272.5975. The examiner can normally be reached on Monday - Friday between 8:30am and 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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**Djura Malevic**  
**Patent Examiner**  
**Art Unit 2884**  
**571.272.5975**

  
**CONSTANTINE HANNAHER**  
**PRIMARY EXAMINER**